AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method of providing a mesh telecommunications network with spare capacity arranged in pre-configured cycles, where the mesh telecommunications network includes multiple cycles that may be potentially configured to provide restoration paths, the method comprising the steps of:

pre-selecting a set of candidate cycles for forming into pre-configured cycles, the set of candidate cycles comprising a ranked sub-set of the multiple cycles;

allocating working paths and spare capacity in the mesh telecommunications network based on the set of candidate cycles; and

providing the mesh telecommunications network with spare capacity arranged in pre-configured cycles according to the allocation determined in the preceding step.

2. (Original) The method of claim 1 in which the allocation of working paths and spare capacity is jointly optimized.

3. (Original) The method of claim 1 in which pre-selecting candidate cycles includes ranking a set of closed paths in the mesh telecommunications network according to the degree to which each closed path protects spans on and off the closed path, and selecting candidate cycles from the set of closed paths.

4. (Original) The method of claim 3 in which ranking of closed paths takes into account the cost of the closed path.

5. (Original) The method of claim 3 in which pre-selecting candidate cycles comprises:

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a) determining a topological score of the closed paths in the set of closed paths, where the topological score of said closed path is increased by a value for each span within said closed path that is protected by said closed path, and increased by a larger value for each span not on said closed path that is protected by said closed path;

b) determining the a priori efficiency of each closed path, where the a priori efficiency of a closed path is determine by taking the ratio of the topological score of said closed path with the cost of said closed path; and

c) choosing a select number of closed paths based on the a priori efficiency to be the pre-selected candidate cycles.

6. (Original) The method of claim 1 in which allocation of spare capacity is carried out using an integer linear programming (ILP) formulation, where an objective function minimizes the total cost of spare capacity.

7. (Currently amended) The method of claim 6 in which the objective function is subject to the constraints:

A. All lightpath requirements are routed;

B. Enough channels are provided to accommodate the routing of lightpaths in A[[.]]<u>;</u>

C. The selected set of pre-configured cycles give 100% span protection[[.]]<u>;</u>

D. Enough spare channels are provided to create the pre-configured cycles needed in C[[.]]<u>; and</u>

E. The pre-configured cycles decision variables and capacity are integers.

8. (Original) The method of claim 2 in which allocation of spare capacity is carried out using an integer linear programming (ILP) formulation, where the objective function minimizes the total cost of spare capacity and working capacity.

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9. (Currently amended) The method of claim 8 in which the objective function is subject to the constraints:

A. All lightpath requirements are routed;

B. Enough channels are provided to accommodate the routing of lightpaths in A[[.]];

C. The selected set of pre-configured cycles give 100% span protection[[.]];

D. Enough spare channels are provided to create the pre-configured cycles needed in C[[.]]; and

E. The pre-configured cycles decision variables and capacity are integers.

10. (Original) The method of claim 1 in which a mixed selection strategy is used for pre-selecting candidate cycles.

11. (Original) The method of claim 10 in which the mixed selection strategy includes selecting candidate cycles randomly.

12. (Original) The method of claim 10 in which the mixed selection strategy includes selecting candidate cycles based on absolute number of straddling spans protected by the candidate cycles.

13. (Original) A telecommunications network designed according to the method of claim 1.

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